**Comments on Code:**

Rooms:

* initial
  + This initializes all of the persistent member variables objects which are described below and then goes to the next room (which is main\_menu).
* main\_menu
  + This is the initial menu in the game. It presents you with the options to Revolutionize the world (start the game), Learn about the journey, Industry Perspective, Options (change the sound), and End the Game. Choosing one of these options with the arrow keys and enter brings you to the corresponding room.
* learn
  + This tells you a bit about the game in three different windows and gives you corresponding flavor text in order to brief you on the general concepts of how the game works. It returns to the main\_menu when complete.
* industry\_perspective
  + This tells you about each industry so that you can make a more informed choice. Again this is flavor text, but brings some thematic importance to the game. It returns to the main\_menu when complete.
* industry\_choice
  + This is the first menu of the actual game and gives you the option to choose between three industrys: fusion, genetic engineering, and quantum computing. When complete it moves to the research screen.
* research
  + This gives you the option to choose between a form of in house research and another research company. Each has their benefits and changes relative to the industry. This is described in the chart we created below the investments room. From here it moves to the investments room.
* investments
  + This gives you the option to choose between two different investors. Each has their benefits and changes relative to the industry. This is described in the chart we created below this room. From here it moves to the game\_menu room.

**Figure 1 Research and Investment Variable Changes:**

**Research & investing**

* **Genetic Engineering:**
  + **In-house**
    - funds: - 50 million
  + **Learn Labs**
    - funds: - 100 million
  + **nonsanto** 
    - funds: + 500 million
  + **pita tear**
    - funds: + 400 million
* **Quantum Computing:**
  + **In-house**
    - funds: - 100 million
  + **Commonwealth Institute of Technology**
    - funds: - 200 million
  + **Macrohard**
    - funds: + 600 million
  + **Steve bozniak**
    - funds: + 700 million
* **Fusion Energy:**
  + **In-house**
    - funds: - 300 million
  + **Los Paramos Laboratory**
    - funds: - 700 million
  + **Bill fences**
    - funds: + 5 billion
  + **Hard Bank**
    - funds: + 11 billion
* game\_menu
  + This is the menu where you choose options now that you have setup the game, the background changes relative to the industry. This means that you can choose between Progress As Normal, Go To Conference / Network, Adjust Working Hours, Take a Holiday, Apply for Grant, Look At Market Shares, Quit the Game. This is selected with the up/down arrow keys and the enter button.
* working\_room
  + This room simulates working and this increases the market share for each room relative to the industry. This is accomplished with the persistent member variables obj\_company.market\_share\_per\_day and obj\_company.funds\_gained\_per\_day which are set in the adjust working hours room. The room goes back to game\_menu after seven seconds
* adjust\_working\_hours
  + This room presents you with three options which you can change between by hitting the left and right arrows. These options are 40, 55, and 80 hour work weeks and each affects your obj\_company.market\_share\_per\_day and obj\_company.funds\_gained\_per\_day as shown below. The room then moves back to game\_menu when you select an object with enter.

**Figure 2 Adjust Working Hours Variables Adjustment:**

**Genetic Engineering:**

* + Funds**:**
    - Lowest option: obj\_company.funds\_gained\_per\_day = 25 million
    - Middle option: obj\_company.funds\_gained\_per\_day = 30 million
    - Highest option: obj\_company.funds\_gained\_per\_day = 35 million
  + market share:
    - Lowest option: + 3%
    - Middle option: + 2%
    - Highest option: +1%
* **Quantum Computing:**
  + Funds**:**
    - Lowest option:obj\_company.funds\_gained\_per\_day = 50 million
    - Middle option: obj\_company.funds\_gained\_per\_day = 60 million
    - Highest option: obj\_company.funds\_gained\_per\_day = 70 million
  + market share:
    - Lowest option: + 3%
    - Middle option: + 2%
    - Highest option: +1%
* **Fusion Energy:**
  + Funds**:**
    - Lowest option:obj\_company.funds\_gained\_per\_day = 80 million
    - Middle option: obj\_company.funds\_gained\_per\_day = 90 million
    - Highest option: obj\_company.funds\_gained\_per\_day = 100 million
  + market share:
    - Lowest option: + 3%
    - Middle option: + 2%
    - Highest option: +1%
* vacation
  + This brings you to 1 of 6 locations and manipulates the variables in the game as shown below. There is a 5 in 6 chance that you stay in the current room, and a 1 in 6 chance that you don't go on vacation. There are also interesting quotes and images for each room. After 7 seconds it will go back to game\_menu.

**Figure 3 Take Vacation:**

* **Genetic Engineering:**
  + Funds **=\*** 1.05
  + market share =\* 0.95
* **Quantum Computing:**
  + Funds **=\*** 1.05
  + market share =\* 0.96
* **Fusion Energy:**
  + Funds **=\*** 1.05
  + market share =\* 0.97
* grant\_minigame\_0
  + This is the first screen to the grant minigame. The goal of this game is to collect the money pots to get funding and the faster you do it the less your market share suffers. The exact amount is shown in Figure 4 below. This is a fun minigame which involves collision boxes and similar functionality to Mario in terms of jumping around, which is described further in the objects section. This room then moves to grant\_minigame\_0.
* grant\_minigame\_1
  + This shows the time that it took you to complete the video game which represents how well you did and affects your variables as shown below in Figure 4. This room then moves to game\_menu.

**Figure 4: Minigame (after each game):**

* **Genetic Engineering:**
  + <20
    - Funds=\*1.08
    - Market Share=\*1
  + <30
    - Funds=\*1.04
    - Market Share=\*0.96
  + <40
    - Funds=\*.98
    - Market Share=\*0.92
  + >40
    - Funds\*=..95
    - Market Share=\*0.90
* **Quantum Computing:**
  + <20
    - Funds=\*1.08
    - Market Share=\*1
  + <30
    - Funds=\*1.04
    - Market Share=\*0.96
  + <40
    - Funds=\*.98
    - Market Share=\*0.92
  + >40
    - Funds\*=..95
    - Market Share=\*0.90
* **Fusion Energy:**
  + <20
    - Funds=\*1.08
    - Market Share=\*1
  + <30
    - Funds=\*1.04
    - Market Share=\*0.96
  + <40
    - Funds=\*.98
    - Market Share=\*0.92
  + >40
    - Funds\*=..95
    - Market Share=\*0.90
* market\_shares
  + This demonstrates a graph for the market share of your company with the other two companies. This allows you to track how close you are to having supremacy over the other companies. This is implemented with the obj\_market\_graph with displays them all on the axis. When you hit enter it goes back to the game\_menu.
* conference
  + This room is a bit comical and simulates meeting with investors. It goes through three different investors the last of which tells you to go away. This affects the member variables as shown below and then goes back to the game\_menu.

**Figure 5 Go to conference:**

**Genetic Engineering:**

* + funds =\* 1.05
  + market share =\* 0.97

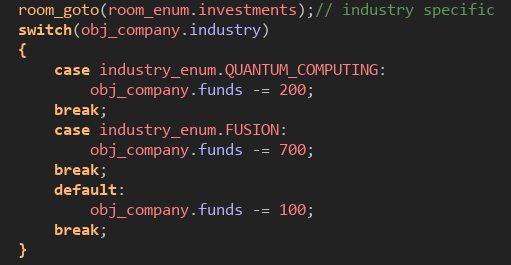
**Quantum Computing:**

* + funds =\* 1.05
  + market share =\* 0.96

**Fusion Energy:**

* + funds =\* 1.05
  + market share =\* 0.95
* game\_over
  + This room shows the game over screen and when the user presses the enter key the game restarts. This is triggered by factors described further in the section on obj\_company
* fusion1-3, genetics 1-3, quantum 1-3
  + This displays each of the three events which are part of the storyline for fusion, genetics, and quantum computing. These increment a global event counter and after the final event room you go to the game\_over screen because you have won!

Objects:

* oPlayer:
  + This is the object that the user controls in the grant minigame
  + The object is initialized with horizontal, vertical speeds, and gravity (hsp, vsp, grv,walksp), a bool for if they are on the floor(on\_floor), number of bags grabbed (num\_grab), and global variables for a time function (global.seconds, steps)
  + During each step of the game, the program checks
    - If the right,left, or up keys are pressed and calculates the amount the user moves
    - If the user if colliding with any of the walls in the room and stops them before they can
    - The user’s value for horizontal speed and on\_floor bool to switch between animated sprite should that are used to correspond with the motion
    - The user’s num\_grab and if it is equal to 10, it takes the user to the win page
    - The steps variable and increment it by 1. Once the steps variable equals the room speed, global.seconds is incremented by 1
* oGrab:
  + This is the object that the user is meant to “grab” in the grant minigame
  + It’s main function is to stay static and if the oPlayer object touches an oGrab object in the game, it will trigger a collision event
  + In the collision event, the num\_grab variable in oPlayer will increment and the instance of oGrab will be destroyed
* winText
  + This is the text that is displayed in the room after the user completes the grant minigame
  + A text is generated to show how well the player did based on the global.seconds variable
  + The global.seconds variable also determines the amount the game point systems (
* Fusion/Genetics/Quantum (1-3) Object
  + These show the three randomly triggered events which pass the day on their respective rooms. Each draws a text at the top showing what you accomplished and an image to accompany it.
* Game\_over\_control
  + This checks if the user enters the enter button and if so restarts the game. This is used on the game over screen in order so that the user can play again!
* generalmenu
  + This is what encapsulates all the many different options that a user may choose from the menu. Depending on what is chosen, it will “go\_to” a respective room.
* obackground
  + These are the backgrounds for each industry in the game menu once the game actually starts and are used in numerous rooms.
* obj\_Menu
  + This is what encapsulates all the many different options that a user may choose from the menu. Depending on what is chosen, it will “go\_to” a respective room.
* obj\_bimage
  + This is the initial for the main menu (all other background gifs thereafter are dependent on the industry chosen).
* Obj\_button\_40, 55, 80
  + These are objects that are inherited from obj\_button\_parent, and allows the user to modify the number of hours that they are working.
* Obj\_button\_parent
  + This is the base class wherein we instantiate the buttons that we use for adjusting working hours in the menu of the game. All buttons (40,55,80) are children of this parent class
* obj\_company
  + This is the persistent object which tracks the most important variables in the game, the company funds and market share, as well as the industry.
  + This object also checks for the game win or lose conditions and switches the room if that happens
  + This object also contained an enumerated state for the industry in order to make checking for it and setting it throughout the game much easier to understand.
* obj\_other\_company\_2
  + This object serves as the opponent in the game and updates every time the room switches in order to guarantee that itself and obj\_other\_company\_1 comprise the rest of the market share left in the market (out of a total percentage of 100).
  + This also fluctuates by -3%-3% each cycle in order to make the competition more interesting (randomly decided)
* obj\_fundsANDmarket
  + This is the persistent object we made that stores the capital and market share progress of the individual throughout the game.
  + It will consistently update as events progress, and be displayed in the top right corner of the game.
* obj\_industry
  + This is where the user will initialize the industry they chose. They may choose from quantum computing, genetic engineering, or nuclear energy/fusion.
* obj\_investments
  + This is where we store the investment information, as in which area the user wants to store their funds as they change over time depending on the other choces of the user
* obj\_learn\_more\_text
  + This controls the learn more room. This displays three different sets of text, each of which is switched between by pressing the spacebar and formatted to fit in the window. After the third spacebar it goes back to the main menu.
* obj\_market \_axis
  + This is the object that handles the axis’ of our ‘market share’ option from the menu
  + Users will access the market share to see how they are doing relevant to competition (where competitors' market share is modeled by: 1/Marketshareours
* obj\_market\_graph
  + This is where we drew the graph for the market share. Essentially, all the bars tracking market share progress is a rectangle that is growing with successive modifications of stats (the bar width is 143 pixels) and the max “market share” is really just a pixel size of 495.
* obj\_person\_typing
  + This is the object we made for a sprite we designed simulate the typing on a keyboard in our waiting room
  + Users will access the waiting room from the list of options throughout the game
* obj\_research
  + This is where, depending on the industry chosen by the user, the buttons in a menu will update and the user will be able to select from two different options to how they want to invest
  + This is all encapsulated within a switch statement that, depending on the research they choose, will alter the global member variables (market\_share and capital)

Example of incrementing based on industry

* Obj\_rooms
  + This persistent object creates the enum for objects which switches between the rooms. This allows us to easily reorder the rooms without affecting in game functionality. While not necessary it was good style and very useful. The mapping is as follows:

enum room\_enum{

initial = 0,

main\_menu = 1,

learn = 2,

industry\_perspective = 3,

industry\_choice = 4,

research = 5,

investments = 6,

game\_menu = 7,

working\_room = 8,

adjust\_working\_hours = 9,

vacation = 10,

grant\_minigame\_0 = 11,

grant\_minigame\_1 = 12,

market\_shares = 13,

conference = 14,

game\_over = 15,

fusion1 = 16,

fusion2 = 17,

fusion3 = 18,

genetics1 = 19,

genetics2 = 20,

genetics3 = 21,

quantum1 = 22,

quantum2 = 23,

quantum3 = 24

}

* Obj\_vacation\_choice
  + This is the object that holds all of the vacation choices. Depending on the randomizer, the user may experience different vacation screens (or none at all -- with a witty jeff bezos quote)
* Obj\_working\_hours\_title
  + Shows the text "How many hours should they work?" in the adjust working hours room
* Obj\_working\_text
  + A deceivingly important object this handles all of the working room functionality. This means that it decrements the funds and increases the market share for each room relative to the industry. This is accomplished with the persistent member variables obj\_company.market\_share\_per\_day and obj\_company.funds\_gained\_per\_day which are set in the adjust working hours room.